

Quarterly Report

ON THE

PROGRESS OF SEGREGATION CAMPS

AND

Medical Treatment of Sleeping Sickness in Uganda.

For the Quarter December 1st, 1907–February 29th, 1908.

BY

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WITH AN INTRODUCTION

BY

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INTRODUCTION.

There is no doubt that the hopes expressed by Prof. Koch and others that Atoxyl would prove a general and permanent cure for cases of Sleeping Sickness must now be abandoned. Personally I have never allowed myself to hope for a cure in more than a limited number of favourable cases. This may, I think, still be hoped for, though the time has not yet arrived when we can say with confidence that any apparent cure will remain permanent.

There is equally no doubt that the administration of Atoxyl and allied drugs has greatly prolonged life in very many cases, in some of which we may still hope for a cure. Lada Singh, of the Indian Contingent, K.A.R., is apparently quite well three years after trypanosomes were found in his blood and two years after trypanosomes were last seen. Mr. Zoller was well and at work a few months ago, more than two years after he was found to be suffering from trypanosomiasis. Mr. Coutinho also, after two and a half years, and two years after cessation of treatment at Nairobi, is apparently cured. On the other hand, though it is now nearly three years since trypanosomiasis was discovered in Narain Singh, another of the Indian Contingent, and a year since trypanosomes were last found on re-examination, yet he still has symptoms which may be due to Sleeping Sickness.

It is true that our statistics from Sleeping Sickness Camps show a "progressive" death-rate among all classes of cases, but this was to be expected, once it became certain that the good effects of Atoxyl cannot, in many or most cases, be regarded as permanent.

Prof. Koch now states that trypanosomes "permanently" disappeared in only 20 per cent. of his cases, and agrees that it is most important for the treatment, if it is to be successful, to be begun at an early stage of the disease. In my opinion we may still hope for a percentage of permanent cures, and, though they may not reach Prof. Koch's estimate of 20 per cent. in present circumstances, improvements in method and in the quality of the drug may conceivably produce a still higher percentage of cures in the near future. The results obtained with Atoxyl and Mercury, for instance, are at present more promising than those from the original Atoxyl treatment. Further, the fact remains that trypanosomes are banished, for a time at all events, from the peripheral blood-stream, and the risks of infection are proportionally diminished in consequence. There is at present no reason for discontinuing the use of Atoxyl, although the results from its use have not fulfilled the hopes that were once entertained.

From the tables in this quarterly report (December, 1907–February 1908), we see that:—

Of 140 A* cases in the original series of 1,135 patients only 14 or 10 per cent., have died and 43 are improved.

Of 493 B cases 100, or 20 per cent., have died and 149 are improved.

Again—

Of 222 cases admitted December, 1906–February, 1907, 122 were alive on February 29, 1908, and 26 improved.

* *Vide* page 17. (Ed.)

Of 137 cases admitted March-May, 72 were alive February 29, 1908, and 9 improved.

Of 172 cases admitted June-August, 139 were alive February 29, 1908, and 48 improved.

Of 596 cases admitted September-November, 462 were alive February 29, 1908, and 208 improved.

Judging from my two years' clinical experience of Sleeping Sickness before Atoxyl came into use, I should say that these figures undoubtedly show that its administration prolongs life considerably on the average, and although the cases recorded of long maintained improvement are at present a diminishing quantity, it must not be forgotten that our first few months were those of our least experience and also that we have now a more constant and more reliable supply of the remedy as well as a greater knowledge of its use and limitations.

The complications, such as blindness, which have arisen during the administration of Atoxyl and which appear to be, at any rate in many instances, due to the drug itself or some faulty condition of it, have occurred in such a small percentage of the total number of cases treated that I do not think they can be allowed to weigh against the temporary benefits which result to the majority and the possibility of the permanent cure of some, or against the importance of following to a definite conclusion the experiment which has already been carried so far.

In conclusion, the present situation as regards Atoxyl may be summed up as follows:—

1. In most cases there is a temporary improvement from its use.
2. There is probably in most cases prolongation of life.
3. In all cases which may come in contact with fly there is diminution of their infectivity.
4. There are still considerable numbers of original series A and B cases who are still alive and some of these may be eventually cured.
5. The results from Atoxyl and Mercury are at present promising and may prove to be more lasting than those from Atoxyl alone.
6. Experience has been gained in the use of the drug, the supply is now constant, and it is to be hoped that the quality will improve yet further.
7. We have at present no other treatment apart from Atoxyl and its allies which has shown any sign of successful results whatever.

(Signed) A. D. P. HODGES,

Senior Medical Officer, Uganda.

June 4, 1908.

QUARTERLY REPORT ON THE PROGRESS OF SEGREGATION CAMPS AND MEDICAL TREATMENT OF SLEEPING SICKNESS IN UGANDA FOR THE QUARTER DECEMBER 1, 1907—FEBRUARY 29, 1908.

As I mentioned in my previous reports from December 12, 1906, up to November 30, 1907, a total number of 1,135 patients had been admitted and treated at our three Sleeping Sickness Camps in Uganda.

I will first describe what is the present state (on February 29, 1908) of these 1,135 patients.

The Medical Superintendents of the three camps report that on February 29, 1908, of their 1,135 patients—

292, or 25·5 per cent., had definitely improved under treatment and that this improvement has been maintained.

94, or 8 per cent., had relapsed after a temporary improvement.

287, or 25 per cent., continue in much the same state as they were on admission.

131, or 11·5 per cent., were away at the time of this examination.

331, or 30 per cent., were dead.

A comparison of these results with what was reported of these same patients on November 30, 1907 (just three months ago) is seen in the following table :—

TABLE I.

Comparing the present state of the 1,135 patients suffering from Sleeping Sickness, and admitted to our camps between December 1, 1906—November 30, 1907, with what was observed three months ago :—

On November 30, 1907.	On February 29, 1908.	Condition.
517 (or 45 per cent.)	292 (or 25·5 per cent.)	Had definitely improved under treatment and this improvement had been maintained.
77 (or 7 per cent.)	94 (or 8 per cent.)	Had relapsed after temporary improvement.
284 (or 25 per cent.)	287 (or 25 per cent.)	Continue in same state as on admission.
37 (or 4 per cent.)	131 (or 11·5 per cent.)	Were away at the time of examination.
220 (or 19 per cent.)	331 (or 30 per cent.)	Are dead.
1,135	1,135	Total.

It is seen from the above table that in three months the improved cases have decreased by 20 per cent.; that the number of relapsed and stationary cases are just what they were before and that the deaths have increased by 11 per cent.

TABLE II.

Examining the after history of these cases class by class and comparing what is now observed with what was noted three months ago, it is found that :—

Of 140 A * cases (admitted before November 30, 1907):—

Condition.	On November 30, 1907.	On February 29, 1908.
Improved	88	43
Relapsed	16	8
Continue in same state ..	18	53
Absent at time of examination	13	22
Died	5	14
Total	140	140

TABLE III.

Of 493 B cases (admitted before November 30, 1907):—

Condition.	On November 30, 1907.	On February 29, 1908.
Improved	266	149
Relapsed	44	46
Continue in same state ..	126	152
Absent at time of examination	13	46
Died	44	100
Total	493	493

TABLE IV.

Of 431 C cases (admitted before November 30, 1907):—

Condition.	On November 30, 1907.	On February 29, 1908.
Improved	156	95
Relapsed	14	37
Continue in same state ..	134	77
Absent at time of examination	11	63
Died	116	159
Total	431	431

* *I*ide page 17. (ED.)

TABLE V.

Of 71 D cases (admitted before November 30, 1907):—

Condition.	On November 30th, 1907.	On February 29th, 1908.
Improved	7	5
Relapsed	3	3
Continue in same state ..	6	5
Absent at time of examination	—	—
Died	55	58
Total	71	71

TABLE VI.

And if A and B cases are grouped together as “early cases” and C and D as “late cases,” the comparison works out as follows:—

State.	On November 30, 1907.		On February 29, 1908.	
	Early Cases A and B.	Late Cases C and D.	Early Cases A and B.	Late Cases C and D.
Improved	Per cent. 56	Per cent. 32·5	Per cent. 32	Per cent. 20
Relapsed	9	3·5	8	8
Continue in same state ..	23	28	32	16·5
Absent at time of examination	4	2	10	12·5
Died	8	34	18	43

It will be seen from the above Table, No. VI, that the death-rate among early cases has increased 10 per cent. and among late cases 9 per cent. in three months.

All our medical superintendents of camps agree that the medicinal treatment of late cases of Sleeping Sickness has not been and is not likely to be successful. As the death-rate among early and late cases seems to be increasing *at the same rate* (as seen from the above Table, No. VI), it does not look as if medicinal treatment was going to do the early cases much ultimate good either.

As I mentioned in previous reports, the 1,135 patients admitted to the camps between December 1, 1906, and November 30, 1907, were all treated with Atoxyl, about half the number being given Mercury in addition.

The actual figures as seen from the tables are :—

634 treated with Atoxyl only.

501 treated with Atoxyl and Mereury.

A comparison of the results obtained from these methods is seen on Tables VII and XVI.

If these methods are put down in their apparent order of excellence, firstly as judged by low death-rate, and secondly as judged by the number of cases that have shown improvement after treatment, it seems that patients ultimately do better on Atoxyl and Mereury than on Atoxyl alone, but there are three fallacies :—

(1) At Usoga, where the death-rate owing to the famine has been abnormally high, Atoxyl alone has been the usual treatment.

(2) At two of the camps a course of Atoxyl treatment is given first and Mereury afterwards. Under Atoxyl only, therefore, are included those cases who have lived long enough to get Atoxyl but who have either died or been in a state past medical aid before Mereury in addition could be given.

(3) A third fallacy about these figures, and to my mind the most important of all, is that all patients admitted during the period December 1, 1906, to May 31, 1907 (the first six months of the segregation scheme), were treated with Atoxyl only, and it is only since the latter date that Atoxyl and Mereury treatment has been instituted, so that we are comparing patients who have been under observation from 9 to 15 months with patients who have been under observation less than nine months (*see* Table No. XVI).

METHODS OF TREATMENT OF CASES OF SLEEPING SICKNESS ADMITTED BETWEEN DECEMBER 1, 1906, AND NOVEMBER 30, 1907.

In Order of Death Rate.

I.—Method (*g*), Atoxyl and Mereury; Busiro Camp, Dr. Collins, 4 per cent.

II.—Method (*k*), Atoxyl and Mereury; Kyagwe Camp, Dr. van Someren, 15 per cent.

III.—Method (*i*), Atoxyl and Mereury; Usoga Camp, Dr. Baker, 25.5 per cent.

IV.—Method (*b*), Atoxyl only; Usoga Camp, Dr. Baker, 35 per cent.

V.—Methods (*a*), (*b*), (*e*) and (*d*), Atoxyl only; Busiro Camp, 45 per cent.

In Order of "Improved" Cases.

I.—Method (*k*), Atoxyl and Mereury, 40.5 per cent.

II.—Method (*b*), Atoxyl only (at Usoga), 35 per cent.

III.—Method (*i*), Atoxyl and Mercury, 30 per cent.

IV.—Method (*g*), Atoxyl and Mereury, 19 per cent.

V.—Methods (*a*), (*b*), (*e*), and (*d*) at Busiro, Atoxyl only, 8 per cent.

A detailed description of these methods follows.

The following methods of treatment have been used since our camps first started :—

I.—Atoxyl only.

(*a*) 0.4 gm. every twentieth and twenty-first day.

(*b*) 0.4 gm. every tenth and eleventh day.

- (c) 0.4 gm., increasing gradually every tenth and eleventh day up to 0.7 gm.
- (d) Van Campenhout's method (very similar to method (c)).
- (e) 1 gm. every fifteenth and sixteenth day.
- (f) 0.6 gm. every fifteenth and sixteenth day.

II.—*Atoxyl and Mercury.*

Course of Atoxyl treatment lasting a month or six weeks, during which time at least 4 gm. of the drug are given, followed by—

- (g) Mercury perchloride, $\frac{1}{16}$ grain, twice daily (Dr. J. Collins).
- (h) Mercury perchloride, $\frac{1}{6}$ grain hypodermically, for six doses spread over fourteen days (Dr. Collins).
- (i) Metallic mercury (Lambkin's cream), 5 minims once a week (Dr. C. J. Baker).
- (j) Intra muscular injections of 1 c.c. of a 1 per cent. solution of soluble mercury salts, repeated every five days (Drs. Goodliffe and Bayon).

Combined simultaneous Atoxyl and Mercury treatment (Dr. van Someren):—

- (k) First day, Atoxyl, 1 gm; Mercury perchloride, 0.01 gm. Second day, Atoxyl, 1 gm. On fourteenth day, Atoxyl, 0.5 gm.; Mercury perchloride, 0.01 gm. On fifteenth day, Atoxyl, 0.5 gm., repeating every fourteenth and fifteenth day.
- (l) Same as above, except that one initial dose of 1 gm. Atoxyl is given, the remaining doses being 0.5 gm.

* III.—*Soamin (Sodium-amino-phenyl-arsinate. Burroughs Wellcome and Co.).*

1 gm. on two successive days, followed by 0.5 gm. every fourteenth and fifteenth day.

IV.—*Soamin and Mercury.*

Same as method (k), only Soamin is used instead of Atoxyl.

V.—*Antimony Treatment.*

Initial doses of $\frac{1}{16}$ grain Antimony Tartrate, followed by $\frac{1}{8}$ grain every tenth and eleventh day.

VI.—*Atoxyl, followed by Antimony.*

A course of Atoxyl first, lasting three months, and then course of Antimony treatment in doses, as above, every tenth and eleventh day.

Our methods of treatment have been numerous, but it is only by experimenting with various methods that we can hope to advance. A good many of the above methods have now been discarded.

Method (a) has been given up because patients seemed to do better with rather more Atoxyl. Methods (c) and (d) have been given up because eye trouble and total blindness was found to be much more frequent among patients who had been given Atoxyl on a system of increasing doses than other systems. Method (e) has been given up because the doses seemed rather too large. So that the patients who are put on Atoxyl only are now being treated by one of two methods: the great majority by method (b), which is the method originally introduced by Professor R. Koch, and the remainder by method (f), which Dr. Collins has found to be of value.

* In the original here and elsewhere *Kharsin* was written but it is clear that *Soamin* was the substance used. (ED.)

The results obtained from December, 1906, to November 30, 1907, when many methods were used, are shown on Table VII, while the results obtained from the two final methods (*b*) and (*f*), are shown and compared on Table XX.

Methods (*j*) and the treatment by means of Soamin and Antimony have only been tried on a few patients admitted since November 30, and details of the results obtained by means of these methods follow later.

TABLE VII.

A comparison of the results obtained at the various Camps with Atoxyl, and Atoxyl and Mercury treatment during the period December, 1906—November, 1907, is seen in the following Table:—

Present state on February 29, 1908.	Busiro. (Dr. Collyns.)		Kyagwe. (Dr. van Somerens.)	Usoga. (Dr. C. J. Baker.)	
	Atoxyl only. Method (<i>b</i>) (<i>c</i>) (<i>d</i>).	Atoxyl and Mercury. Method (<i>g</i>) or (<i>h</i>).	Atoxyl and Mercury. Method (<i>k</i>) or (<i>l</i>).	Atoxyl only. Method (<i>b</i>) few (<i>e</i>).	Atoxyl and Mercury. Method (<i>i</i>).
Improved	Per cent. 8	Per cent. 19	Per cent. 40·5	Per cent. 35	Per cent. 30
Relapsed	6	15	11	7	5·5
Continue in same state	38	62	12·5	3	40
Absent at time of Examination ..	3	—	21	20	—
Died	45	4	15	35	25·5
Number of Cases ..	382	100	328	252	73

TABLE VIII.

UNDER ATOXYL ONLY.

Admissions during quarter December 1, 1906–February 28, 1907.

Present State on February 29, 1908.	Class of Case on Admission.				Totals.
	A	B	C	D	
Improved	9	15	2	—	26
Relapsed	4	6	4	—	14
Continue in same state ..	29	41	6	—	76
Absent at time of examination	—	1	—	—	1
Died	10	25	52	13	100
Totals	52	88	64	13	217

TABLE IX.

UNDER ATONYL ONLY.

Admissions during the quarter March 1-May 31, 1907 :—

Present State on February 29, 1908.				Class of Case on Admission.				Totals.
				A	B	C	D	
Improved	..	..	..	—	3	—	—	3
Relapsed	..	..	..	—	3	—	—	3
Continue in same state	..	..	..	10	34	6	1	51
Absent at time of examination				—	4	3	—	7
Died	..	..	..	1	26	33	2	62
Totals				11	70	42	3	126

TABLE X.

UNDER ATONYL ONLY.

Admissions during the quarter June 1-August 31, 1907.

Present State on February 29, 1908.	Camp.	Class of Case on Admission.				Totals.
		A	B	C	D	
Improved	Busiro	—	—	—	—	—
	Kyagwe	—	—	—	—	7
	Usoga	—	3	3	1	—
	Sesse	—	—	—	—	—
Relapsed	Busiro	—	—	—	2	2
	Kyagwe	—	—	—	—	—
	Usoga	—	—	—	—	—
	Sesse	—	—	—	—	—
Continue in same state	Busiro	2	4	3	—	9
	Kyagwe	—	—	—	—	—
	Usoga	—	—	—	—	—
	Sesse	—	—	—	—	—
Absent at time of examination	Busiro	—	2	—	—	2
	Kyagwe	—	—	—	—	—
	Usoga	—	—	1	—	1
	Sesse	—	—	—	—	—
Died	Busiro	—	1	8	2	11
	Kyagwe	—	—	—	—	—
	Usoga	—	1	1	2	4
	Sesse	—	—	—	—	—
Totals	—	2	11	16	7	36

TABLE XI.

UNDER ATOXYL ONLY.

Admissions during the quarter September 1–November 30, 1907.

Present State on February 29, 1908.	Camp.	Class of Case on Admission.				Totals.
		A	B	C	D	
Improved	Busiro	—	—	—	—	—
	Kyagwe	—	—	—	—	—
	Usoga	8	46	28	—	82
	Sesse	—	—	—	—	—
Relapsed	Busiro	—	1	1	—	2
	Kyagwe	—	—	—	—	—
	Usoga	—	6	12	—	18
	Sesse	—	—	—	—	—
Continue in same state	Busiro	—	6	2	4	12
	Kyagwe	—	—	—	—	—
	Usoga	1	4	2	—	7
	Sesse	—	—	—	—	—
Absent at time of examination	Busiro	—	—	—	—	—
	Kyagwe	—	—	—	—	—
	Usoga	3	10	37	—	50
	Sesse	—	—	—	—	—
Died	Busiro	—	1	—	—	1
	Kyagwe	—	—	—	—	—
	Usoga	1	20	31	31	83
	Sesse	—	—	—	—	—
Totals	—	13	91	113	35	255

TABLE XII.

UNDER ATOXYL AND MERCURY.

Admissions during the quarter December 1, 1906—February 28, 1907.

Present State on February 29, 1908.	Class of Case on Admission.				Totals.
	A	B	C	D	
Improved	—	—	—	—	—
Relapsed	—	—	—	—	—
Continue in same state ..	2	2	1	—	5
Absent at time of examination	—	—	—	—	—
Died	—	—	—	—	—
Totals	2	2	1	—	5

TABLE XIII.

UNDER ATOXYL AND MERCURY.

Admissions during the quarter March 1-May 31, 1907.

Present State on February 29, 1908.	Class of Case on Admission.				Totals.
	A	B	C	D	
Improved	—	6	—	—	6
Relapsed	—	—	—	—	—
Continue in same state ..	—	10	1	—	11
Absent at time of examination	—	—	—	—	—
Died	—	1	1	—	2
Totals	—	17	2	—	19

TABLE XIV.

UNDER ATOXYL AND MERCURY.

Admissions during the quarter June 1-August 31, 1907.

Present State on February 29, 1908.	Camp.	Class of Case on Admission.				Totals.
		A	B	C	D	
Improved	Busiro	—	5	2	—	7
	Kyagwe	5	14	14	—	33
	Usoga	—	1	—	—	1
	Sesse	—	—	—	—	—
Relapsed	Busiro	—	8	2	—	10
	Kyagwe	1 (T+)	4	4	—	9
	Usoga	—	1 (T+)	—	—	1
	Sesse	—	—	—	—	—
Continue in same state	Busiro	7	16	10	—	33
	Kyagwe	—	13	5	—	18
	Usoga	—	—	—	—	—
	Sesse	—	—	—	—	—
Absent at time of examination	Busiro	—	—	—	—	—
	Kyagwe	5	1	—	—	6
	Usoga	—	—	—	—	—
	Sesse	—	—	—	—	—
Died	Busiro	—	—	—	—	—
	Kyagwe	—	4	7	5	16
	Usoga	—	1	1	—	2
	Sesse	—	—	—	—	—
Totals		18	68	45	5	136

TABLE XV.
UNDER ATOXYL AND MERCURY.
Admissions during the quarter September 1–November 30, 1907.

Present State on February 29, 1908.	Camp.	Class of Case on Admission.				Totals.
		A	B	C	D	
Improved	Busiro	1	5	—	—	6
	Kyagwe	18	42	37	3	100
	Usoga	2	9	9	1	21
	Sesse	—	—	—	—	—
Relapsed	Busiro	—	1	3	1	5
	Kyagwe	2	14	11	—	27
	Usoga	1	2	—	—	3
	Sesse	—	—	—	—	—
Continue in same state	Busiro	—	7	6	—	13
	Kyagwe	—	6	17	—	23
	Usoga	2	9	18	—	29
	Sesse	—	—	—	—	—
Absent at time of examination	Busiro	—	—	—	—	—
	Kyagwe	14	28	22	—	64
	Usoga	—	—	—	—	—
	Sesse	—	—	—	—	—
Died	Busiro	—	—	1	1	2
	Kyagwe	—	13	17	2	32
	Usoga	2	7	7	—	16
	Sesse	—	—	—	—	—
Totals		42	143	148	8	341

TABLE XVI.

A Table comparing the present state of patients who have undergone a course of ATOXYL, or ATOXYL and MERCURY treatment, admitted during the different periods of three months.

Present State on February 29, 1908.	First Quarter.	Second Quarter.	Third Quarter.		Fourth Quarter.		Fifth Quarter.	
	Atoxyl only.	Atoxyl only.	Atoxyl only.	Atoxyl and Mercury.	Atoxyl only.	Atoxyl and Mercury.	Atoxyl only.	Atoxyl and Mercury.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Improved	12	2.5	19	30	31.5	37	31	57
Relapsed	6.5	2.5	5	15	8	10	3	4
Continue in same state	35	40	25	38	7.5	19	49	27
Absent at time of examination	0.5	5	8	4	20	18	5.5	7
Died	46	50	43	13	33.5	15	11.5	5
Total No. of cases	217	126	36	136	255	341	973	708

As I mentioned above, 8 per cent. of these 1,135 patients have relapsed and 30 per cent. of them are dead at the present time, and yet it has only been quite occasionally that our Medical Officers have been able to find trypanosomes in these relapsed or dying cases. Gland puncture has nearly always proved negative. Trypanosomes have been found in six treated cases as follows:—

At Kyagwe Camp.—One case, a child, was admitted in August, was treated with Atoxyl for three months, receiving in all 7 gm. of the drug; Atoxyl was then omitted and, in two months from the day of stopping, trypanosomes were found to be swarming in the blood.

Another child had only 1 gm. of Atoxyl because of the then uncertain quality of the drug; a month later trypanosomes were again present in the blood.

Another case relapsed with fever and trypanosomes on the thirteenth day after the last injection of Atoxyl, while another child relapsed with fever and trypanosomes (seauty) in its blood *only seven days* after the last injection of Atoxyl. This last case was having double doses of 0.4 gm. Atoxyl every tenth and eleventh day and had four injections.

One has relapsed with trypanosomes in his glands and another with trypanosomes in his blood at Usoga Camp, while under a course of Atoxyl. They have received doses as follows:—

1. Luba had 10.2 gm. of Atoxyl; last dose 1 gm. on November 16. On December 14, trypanosomes numerous in lymphatic glands.
2. Lasito had 10.4 gm. of Atoxyl; last dose November 16. On December 14 trypanosomes were numerous in his blood.

The above are the only cases (of the admissions between December 1, 1906, and November 30, 1907) where trypanosomes have been rediscovered.

As I mentioned in previous reports, these 1,135 patients were all treated with Atoxyl, about half the number being given Mercury in addition.

The actual figures which can be seen from the table are:—

634 treated with Atoxyl only.

501 treated with Atoxyl and Mercury.

A comparison of the results of these two methods is seen in a table on page 19.

An examination of this table seems to show at first glance that patients do much better on Atoxyl and Mercury than on Atoxyl only, but there are two obvious fallacies:—

1. The Atoxyl is given first and the Mercury afterwards; under "Atoxyl only" are included all those cases who lived just long enough to get Atoxyl but not long enough to get Mercury.
2. At Usoga Camp, where the death rate is very high (owing to the famine), Atoxyl alone has been the usual treatment.

Atoxyl and Mercury treatment has also been used very extensively since November (*see later*).

Dr. van Someren, who has had perhaps more experience of this Atoxyl and Mercury treatment than any of the other Medical Officers, says, when reporting on his results in March, 1908:—

"I am, on the whole, very disappointed with the subsequent results of the combined treatment—Atoxyl with Mercury—and unless my results

are markedly superior to those from other camps, I would suggest that it be left off save in a few cases.

"For the first three months my results were and again this time are very good, but they seem to fall off considerably during the next quarter, so I doubt if in the end the results are a bit better than Atoxyl alone."* (See tables VII & XXVI).

In my previous reports on these 1,135 people certain patients were noted as presenting symptoms which were probably due to the Atoxyl with which they had been treated.

These symptoms were giddiness, colic and diarrhoea, dimness of vision and blindness, vomiting, paresis of lower extremities, etc. The giddiness, colic and diarrhoea or vomiting in no case persisted.

Of the 33 cases of *dimness of vision* reported three months ago, 5 are dead, 11 have recovered, 6 are blind, and 11 remain in the same state.

Of the 14 *totally blind* cases reported three months ago, 4 are dead; the power of vision has not returned to any of the remainder.

The present state of those patients admitted to our Sleeping Sickness Camps between December 1, 1906, and November 30, 1907, has now been described.

TABLE XVII.

From November 30, 1907, to February 29, 1908, 1,712 Patients have been admitted to our Segregation Camps, as follows:—

Camp.	Admissions during the month of			Totals.
	December, 1907.	January, 1908.	February, 1908.	
Busiro	53	41	50	144
Kyagwe	86	75	31	192
Usoga	221	207	110	538
Sesse	219	369	250	838
Total	579	692	441	1,712

* Dr. van Someren was writing of the treatment by Atoxyl and Mercury given concurrently. (Ed.)

It will be seen from these figures that patients continue to come to our camps for treatment in a satisfactory manner, as 600 more patients have been admitted during the last three months than during the whole previous year.*

A new camp has been started on the Island of Bugala, Sesse, close to the site previously used by the German Commission under Prof. R. Koch. Though patients seemed rather shy of further treatment on Sesse at first, I am glad to say that the islanders are going there in large numbers. Dr. J. H. Goodliffe is in charge of the camp and Dr. Bayon is assisting him.

Dr. Goodliffe, when reporting at the end of his first month, said that 208 patients had presented themselves for treatment, 105 of whom said that they had previous injections of medicine from the German doctors.

A history of these 105 patients, all of whom said that they had had previous injections (presumably of Atoxyl), is interesting. 61 were males and 44 were females. In 32 of them—20 males and 12 females—trypanosomes were found by Dr. Goodliffe in the lymphatic gland juice. It is impossible to say, of course, how much Atoxyl any of these patients had had, as their statements are so unreliable, but nearly all of them said that they had had many injections.

In these 32 patients the typical gland enlargement was present, but the glands seemed harder than normal.

In 73 the trypanosomes could not be found in the lymphatic glands. In 15 of these 73 there was no appreciable gland enlargement and no symptoms of Sleeping Sickness, although, presumably, when they first came for treatment to Prof. Koch they were infected. In those remaining (of these 73 patients) in whom trypanosomes could not be found there was a certain amount of gland enlargement, but the glands were hard and fibrous.

All these 58 presented some symptoms of Sleeping Sickness. From what is said later on in this report under "symptoms possibly due to Atoxyl," it will be seen that a large proportion of these previously treated patients developed ocular symptoms on being given more Atoxyl.

The camp on Sesse differs somewhat from the other camps. Only comparatively few of the patients live in hospital, *i.e.*, the bad cases, and those without homes of their own. All the rest come up for treatment every three or four days and live in their own homes. So far Dr. Goodliffe reports that the people come very regularly. If a patient comes up on a day on which Atoxyl is not due, he or she is given a dose of some tonic or other medicine which helps in the treatment.

The only objection to Sesse as a treatment centre is that there is a chance that many of the patients, in going to and from the dispensary to their homes, are bitten by tsetse flies and might be reinfected with trypanosomes. A great deal is now being done in the way of clearing on these islands, and the Chiefs are continually impressing on the people the danger of going down to uncleared areas on the lake shore, so that I think at the present time that Sesse islanders are not bitten by tsetse flies to anything like the extent that formerly prevailed.

Luckily there is any amount of native food on these islands, so that a large amount of traffic between Sesse and the mainland is not essential. Such traffic as there is is now confined to properly cleared ports on the coast and islands.

These 1,712 have been admitted from the following Sazas :—

UGANDA (1,170).					USOGA (527).				
Busiro	..	..	..	246	Mero's	..	..	..	34
Kyadondo	..	..	..	56	Bunya	..	..	..	263
Bulemezi	..	..	..	6	Budiope	..	..	..	22
Singo..	..	..	..	6	Mugomba	..	..	..	6
Butambala	..	..	..	3	Nanyumba	..	..	..	127
Mawokota	..	..	..	10	Bukoli	..	..	..	23
Buddu	..	..	..	3	Zibondo's	..	..	..	10
Buvuma	..	..	..	83	Tubingwa's	..	..	..	8
Kyagwe	..	..	..	63	Menia's	..	..	..	34
Kweba's	..	..	..	693					
Kaolo	..	..	..	1					
Total	..	..	..	1,170	Total	..	..	..	527
UNYORO					2				
KAVIRONDO					9				
KIKUYU					1				
ANKOLE					2				
GERMAN EAST AFRICA					1				

These 1,712 patients have received medical treatment as follows :—

1. 973 have been treated with Atoxyl only.
2. 708 have been treated with Atoxyl and Mercury.
3. 13 have been treated with Soamin (Burrongs Wellcome & Co.).
4. 11 have been treated with Soamin and Mercury.
5. 7 have been treated with Antimony.
6. 6 old cases (admitted before November 30) have had Antimony subsequent to a course of Atoxyl.

Of the 1,170 Waganda 42, or 3·5 per cent., have died within three months of admission.

Of the 527 Wasoga 102, or 19 per cent., have died within three months of admission.

This very great difference in the death rate between the Waganda and the Wasoga is chiefly due to the famine that is raging in the latter country.

Dr. C. J. Baker, the Medical Superintendent of the Usoga Camp, reports as follows :—

“The death rate at my camp has latterly much increased and is in greater proportion than in the other camps, which may be accounted for as follows :—

I.—The type of the disease as compared with reports and statistics from other camps appears to be much more virulent and the majority of cases, at any rate, are admitted in a more advanced stage of the disease.

II.—The local famine has no doubt been responsible to a great extent for the high death rate—

- (a) Because most cases are admitted in a debilitated condition and semi-starvation, and therefore their recuperative power is much reduced.
- (b) The natural food of the Basoga has always been green food, *i.e.*, bananas, and in their debilitated state they are unable to get used to or to assimilate a new food substance, such as Mtama flour, readily, and I fancy the patients in the huts, who have to

look after themselves, do not all understand the proper cooking of the flour, and therefore many of them eat insufficiently cooked food; which in some cases has caused bowel troubles. It is impossible to supervise this particular item, *i.e.*, the cooking, for such numbers. The ward cases and the children, who have no relations, are under the special charge of ward attendants, and are fed with milk, &c.

- (c) The chiggers, which have become a great pest lately, have not tended to improve the condition of the patients.
- (d) A cold spell of weather in the middle of the month resulted in lung troubles in several of the patients. Two patients died of pulmonary tuberculosis and one of pneumonia.
- (e) Hyænas have accounted for the death of several patients. These have been most persistent in their attacks on the huts latterly, and nearly every night there are alarms in the camp, and it is a wonder to me that there have not been more casualties. Though I have put down poison whenever meat could be spared, I have only found one dead hyæna, which did not have the effect of driving the rest off, as the very next night a child was dragged out of a hut in which two women were sleeping. Each hut is provided with a thorn zareba, and it is the duty of each Katikiro to see that the doors are made secure every night, but the patients themselves are careless and will wander out after dark."

As is said in my previous reports, all Sleeping Sickness patients on arrival at camps are noted down by the Medical Officer in charge as belonging to one of four classes by the symptoms which they present. Cases are either :—

A.—Quite early cases, who feel as a rule well and strong, but present the signs of gland enlargement and the symptoms of occasional attacks of fever and headache.

243 of such cases have been admitted since December 1, 1907.

B.—Early cases, who present symptoms such as itchy skin, pain in the legs, tongue tremor, impotency or amenorrhœa, but who are mentally normal, though there may be fits of drowsiness.

996 of such cases have been admitted since December 1, 1907.

C.—Advanced cases, who are mentally slow, dull, expressionless. There is commonly tremor of the tongue, lips and fingers. Such cases generally walk with difficulty and are very obviously ill. Some wasting of the body is very commonly present.

395 of such cases have been admitted since December 1, 1907.

D.—Very advanced cases, drowsy; bedridden, swallow food with difficulty, and are generally much emaciated. Chiggers are very numerous and bed sores common.

78 of such cases have been admitted since December 1, 1907

If we examine the after history of these cases by class we find that :—

Of the A cases—by February 29, 1908 :—

—	Under Atoxyl.	Under Atoxyl and Mereury.
Improved	63	52
Relapsed	2	2
Continue in same state ..	76	23
Absent at time of examination	8	10
Died	6	3

Of the B cases—by February 29, 1908 :—

—	Under Atoxyl.	Under Atoxyl and Mercury.
Improved	180	287
Relapsed	21	19
Continue in same state ..	237	107
Absent at time of examination	28	37
Died	57	8

Of the C cases—by February 29, 1908 :—

—	Under Atoxyl.	Under Atoxyl and Mercury.
Improved	56	61
Relapsed	8	10
Continue in same state ..	129	53
Absent at time of examination	12	9
Died	28	15

Of the D cases—by February 29, 1908:—

—	Under Atoxyl.	Under Atoxyl and Mereury.
Improved	4	2
Relapsed	—	—
Continue in same state ..	33	43
Absent at time of examination	5	—
Died	20	7

The remaining 37 cases have been treated by other methods and appear separately.

The results obtained by Atoxyl, and Atoxyl and Mercury on these four different classes of patients are compared in the following table.

TABLE XVIII.

Table comparing the results obtained with Atoxyl, and Atoxyl and Mercury in the four different classes of Sleeping Sickness patients admitted to the camps during the period December 1, 1907–February 29, 1908.

Present state on February 29, 1908.	Class of case on admission.							
	A		B		C		D	
	Atoxyl only.	Atoxyl and Mercury.	Atoxyl only.	Atoxyl and Mercury.	Atoxyl only.	Atoxyl and Mercury.	Atoxyl only.	Atoxyl and Mercury.
Improved	Per cent. 42	Per cent. 60·5	Per cent. 35	Per cent. 63	Per cent. 24	Per cent. 41	Per cent. 7	Per cent. 12
Relapsed	1	3	4	4	3	7	—	—
Continue in same state	50	23	46	23	56	36	53	44
Absent at time of examination	3	10	5	8	5	6	8	—
Died	4	3·5	10	2	12	10	32	44

TABLE XIX.
UNDER ATOXYL ONLY.

Admissions during the quarter December 1, 1907–February 29, 1908.

Present State on February 29, 1908.	Camp.	Class of Case on Admission.				Totals.
		A	B	C	D	
Improved	Busiro	1	3	2	—	6
	Kyagwe	—	—	—	—	—
	Usoga	15	99	38	1	153
	Sesse	47	78	16	3	144
Relapsed	Busiro	—	3	1	—	4
	Kyagwe	—	—	—	—	—
	Usoga	2	18	6	—	26
	Sesse	—	—	1 (T +)	—	1
Continue in same state	Busiro	—	23	19	—	42
	Kyagwe	—	—	—	—	—
	Usoga	11	96	50	3	160
	Sesse	65	118	60	30	273
Absent at time of examination	Busiro	—	2	1	—	3
	Kyagwe	—	—	—	—	—
	Usoga	5	12	10	1	28
	Sesse	3	14	1	4	22
Died	Busiro	—	1	2	4	7
	Kyagwe	—	—	—	—	—
	Usoga	6	53	25	4	88
	Sesse	—	3	1	12	16
Totals		155	523	233	62	973

Practically all the 1,712 patients admitted to our camps since November 30 have been treated with either Atoxyl, or Atoxyl and Mercury. The results obtained at the various camps are seen in the following tables, Nos. XIX–XXVII, and these results are compared together in Table No. XX.

If these methods of treatment are put down in their order of apparent excellence—*firstly*, as judged by low death-rate and *secondly* as judged by the number of cases that have shown improvement after treatment, it is seen that Atoxyl and Mercury treatment has apparently been more successful than Atoxyl alone. The most successful method seems to be Dr. van Someren's simultaneous method of initial gramme doses of Atoxyl with $\frac{1}{6}$ -grain Perchloride of mercury.

Methods of Treatment according to Death Rate.

I.—Method (g), Atoxyl and Mercury; Busiro (Dr. Collins), no deaths.

II.—Method (k), Atoxyl and Mercury (Dr. van Someren), 1.5 per cent.

III.—Method (b), Atoxyl alone; Sesse (Drs. Goodliffe and Bayon).
4 per cent.

IV.—Method (j), Atoxyl and Mercury (Drs. Goodliffe and Bayon),
8 per cent.

V.—Method (f), Atoxyl alone; Busiro (Dr. Collins), 11 per cent.

VI.—Method (b), Atoxyl alone (Usoga), 19 per cent.

VII.—Method (i), Atoxyl and Mercury (Usoga), 20 per cent.

Methods of Treatment according to "Improved" Cases.

I.—Method (<i>k</i>), 64 per cent.	} Atoxyl and Mercury.
II.—Method (<i>j</i>), 58 per cent.	
III.—Method (<i>g</i>), 39 per cent.	
IV.—Method (<i>i</i>), 34.5 per cent.	
V.—Method (<i>b</i>), 34 per cent.	} Atoxyl alone.
VI.—Method (<i>b</i>), 32 per cent.	
VII.—Method (<i>f</i>), 10 per cent.	

TABLE XX.

ATOXYL ONLY.

Table comparing the results obtained with Atoxyl at the different camps in people admitted between December 1, 1907, and February 29, 1908:—

Present State on February 29, 1908.	Busiro Camp. Method (<i>f</i>).	Usoga Camp. Method (<i>b</i>)	Sesse Camp. Method (<i>b</i>).
	Per cent.	Per cent.	Per cent.
Improved	10	34	32
Relapsed	6.5	6	—
Continue in same state .. .	67.5	36	59
Absent at time of examination	5	5	5
Died	11	19	4

TABLE XXI.

UNDER ATOXYL AND MERCURY.

Admissions during the quarter December 1, 1907–February 29, 1908:—

Present State on February 29, 1908.	Camp.	Class of case on admission				Totals.
		A	B	C	D	
Improved	Busiro	2	22	8	1	33
	Kyagwe	10	51	35	1	97
	Usoga	2	19	5	—	26
	Sesse	38	195	13	—	246
Relapsed	Busiro	1	6	1	—	8
	Kyagwe	1	2	1	—	4
	Usoga	—	4	1	—	5
	Sesse	—	7	7	—	14
Continue in same state	Busiro	4	17	15	2	38
	Kyagwe	—	12	14	2	28
	Usoga	1	14	4	—	19
	Sesse	15	64	20	3	102
Absent at time of examination	Busiro	—	3	2	—	5
	Kyagwe	4	16	5	—	25
	Usoga	2	7	2	—	11
	Sesse	3	11	—	—	14
Died	Busiro	—	—	—	—	—
	Kyagwe	—	—	8	5	13
	Usoga	1	7	6	—	14
	Sesse	2	1	1	2	6
Totals		86	458	148	16	708

TABLE XXII.

UNDER ATOXYL AND MERCURY.

Method as follows:—(*g*) or (*h*) viz. : A course of Atoxyl is first given covering a period of one or one and a half months (method (*b*)). Mercury perchloride is then given either by the mouth in doses of $\frac{1}{16}$ grain t.d.s., or else by six subcutaneous injections of $\frac{1}{16}$ grain in fourteen days.

Present State on February 29, 1908.	Class of case on admission.				Totals.
	A	B	C	D	
Improved	2	22	8	1	33
Relapsed	1	6	1	—	8
Continue in same state ..	4	17	15	2	38
Absent at time of examination	—	3	2	—	5
Died	—	—	—	—	—
Totals	7	48	26	3	84

TABLE XXIII.

UNDER ATOXYL AND MERCURY.

Admissions during the quarter December 1, 1907–February 29, 1908. Method as follows:—(*i*) viz. : A course of Atoxyl is first given, covering a period of one month (method (*b*)). This is followed by weekly injections of “Lambkin’s Cream,” a special preparation of metallic mercury—five minims is given as a dose.

Present State on February 29, 1908.	Class of case on admission.				Totals.
	A	B	C	D	
Improved	2	19	5	—	26
Relapsed	—	4	1	—	5
Continue in same state ..	1	14	4	—	19
Absent at time of examination	2	7	2	—	11
Died	1	7	6	—	14
Totals	6	51	18	—	75

TABLE XXIV

UNDER ATOXYL AND MERCURY.

Admissions during the quarter December 1, 1907–February 29, 1908. Method as follows:—Sesse Camp (*j*) viz.: A course of Atoxyl treatment lasting six weeks is first given (method (*b*)). This is followed by injections of one cubic centimetre of a 1 per cent. solution of the following soluble mercury salts—Hydrargyrum oxycyanatum cryst, Hydrargyrum cyanatum cryst. The injections are repeated every five days.

Present State on February 29, 1908.	Class of case on admission.				Totals.
	A	B	C	D	
Improved	10	51	35	1	97
Relapsed	1	2	1	—	4
Continue in same state ..	—	12	14	2	28
Absent at time of examination	4	16	5	—	25
Died	—	—	8	5	13
Totals	15	81	63	8	167

TABLE XXV.

UNDER ATOXYL AND MERCURY.

Method as follows:—At Kyagwe Camp (*k*) viz.: On admission, Atoxyl, one gramme; Mercury perchloride, 0.01 gramme; followed next day by Atoxyl, 0.5 gramme. On fourteenth day, Atoxyl, 0.5 gramme; Mercury perchloride, 0.01 gramme. On fifteenth day, Atoxyl, 0.5 gramme. The above treatment is repeated every fourteenth and fifteenth day for three months.

Present State on February 29, 1908.	Class of case on admission.				Totals.
	A	B	C	D	
Improved	38	195	13	—	246
Relapsed	—	7	7	—	14
Continue in same state ..	15	64	20	3	102
Absent at time of examination	3	11	—	—	14
Died	2	1	1	2	6
Totals	58	278	41	5	382

TABLE XXVI.

Table comparing the results of *Atoxyl* and *Mercury* treatment by different methods.

Cases admitted during the quarter December 1, 1907–February 29, 1908.

Present State on February 29, 1908.	Busiro. Method (<i>g</i>) or (<i>h</i>) (Dr. J. Col- lyns).	Usoga. Method (<i>i</i>) (Dr. C. J. Baker).	Kyagwe. Method (<i>k</i>) (Dr. van Somerén).	Sesse. Method (<i>f</i>) (Drs. Good- liffe and Bayon).
	Per cent.	Per cent.	Per cent.	Per cent.
Improved	39	34.5	64	58
Relapsed	10	6.5	4	2
Continue in same state	45	25	26.5	17
Absent at time of exami- nation	6	14	4	15
Died	—	20	1.5	8
Total No. of cases treated	84	75	382	167

As I have already said, *Atoxyl* treatment has now resolved itself into two methods:—

Method (*b*)—0.4 grammes every tenth and eleventh day.

Method (*f*)—0.6 grammes every fifteenth and sixteenth day.

TABLE XXVII.

ATOXYL ONLY.

Table comparing results obtained by the two methods of treatment found to be the best. Admissions between December 1, 1907–February 29, 1908:—

Present State on February 29, 1908.	Busiro Camp. Method (<i>f</i>). (Dr. J. M. Collins.)	Usoga and Sesse Camps. Method (<i>b</i>). (Drs. C. J. Baker and Goodliffe.)
	Per cent.	Per cent.
Improved	10	32.5
Relapsed	6.5	3
Continue in same state ..	67.5	47.5
Absent at time of examination	5	5.5
Died	11	11.5
Number of cases	62	911

The method of giving the drug remains as described in a previous report. Our Medical Officers find it advisable to give the solution warm, and care is taken to well rub the place of injection afterwards.

A solution of Atoxyl should be perfectly colourless when made up and when used, and it should keep practically colourless for 24 hours. Atoxyl which does not come up to this standard is rejected by our Medical Officers for the reason that the yellowness is due to free Aniline, and the result of injecting it in large doses has often been bad.

All our Medical Officers express themselves as satisfied with the Atoxyl they are at present using.

Atoxyl and Mercury treatment has been very extensively used of late at all our camps, and the details of its administration have differed at each camp.

The details of these methods are seen on the four tables Nos. XXI-XXVI.

Dr. van Someren, the Medical Superintendent of the Kyagwe Camp, has perhaps had more experience of this Atoxyl and Mercury treatment than anybody else. He says, when reporting on his results at the end of February, 1908:—

“I am, on the whole, very disappointed with the subsequent results of the combined simultaneous method of giving Atoxyl and Mercury which I have been using up to the present.

Unless my results are markedly superior to those from the other camps I would suggest that it be abandoned as a routine treatment.

For the first three months my results were and again this time are good, but patients seem to fall off considerably during the next quarter, so I doubt that if in the end the results are a bit better than with Atoxyl alone.”

Unfortunately this has been the experience of all our Medical Officers irrespective of the method of treatment employed. As will be seen from the tables of last year's cases and from the admissions from the last quarter, Dr. van Someren's results are rather better than any obtained at the other camps.

Dr. van Someren says in the same report: “The interruption in treatment during November and December, 1907, due to the uncertain effects of the Atoxyl with which we were supplied, has been most unfortunate, and I regret that relapses have been somewhat numerous; whether these relapsed cases will pick up again or not it is impossible to say, but the check to progress seems to be considerable and tends to emphasise the value of Atoxyl in this condition and the necessity for prolonged regular treatment.

I have attempted to reduce the number of injections per patient partly for the sake of bringing the camp better within one's scope, but chiefly owing to the more extensive use I am making of Mercury combined with Atoxyl, the patients naturally demurring to frequent injections.

I am inclined to think that four injections of Atoxyl a month will prove inadequate, and we shall have to return to the previous 10 days' interval.

An accident showed me that Mercury perchloride can be borne in a dose approximating to 1 grain with practically no symptoms.

With regard to Mereury injections, I have found the following point worth attending to:—

Injections should be made with a platinum needle and into the lumbar region, and the spot well massaged afterwards. If this is done the injection need not be intramuscular and there will be no likelihood of local necrosis following. If this is not attended to, or if a steel needle is used, necrosis, chiefly confined to the needle track or even in some cases an abscess, may follow. Patients do not find the injections painful.

Children stand the Mereury treatment well, even in large doses."

Dr. J. M. Collyns says: "I quite agree with Dr. van Someren's remarks about injection of Perchloride of mereury, and I think a platinum needle should always be used. I found, both at this camp (Busiro) and at Kyelume, that patients complain considerably of pain for some days after an injection of Mereury, much more so than in the case of Atoxyl. It has been our custom here to inject fairly deeply into the tissues, and, up to the present time, neither Dr. Sells nor myself have seen a single case of either abscess or necrosis due to the injections."

Dr. C. J. Baker reports as follows:—"I am for the present giving Atoxyl in doses not larger than 0.4 gm. at a time, but after revising the statistics of this camp (Usoga), I have come to the conclusion that the Atoxyl should be given in larger doses. I much regret that reports of severe toxic symptoms from other camps and the unfortunate supply of inferior Atoxyl in October, November and December, 1907, should have induced me to discontinue the more heroic methods of initial 1-gm. doses which I had adopted. It was not until the middle of January, 1908, that Lieut. Archibald and myself recommenced giving Atoxyl regularly, and this loss of confidence in the drug has been detrimental to the camp.

"This month I am beginning again the administration of Atoxyl in 1-gm. doses in suitable cases, except when toxic symptoms appear.

"I do not think that more than half the cases of giddiness can be attributed to the toxic effects of the drug, as I find that many of the patients on cross-examination have noticed this symptom before admission, and in some cases the giddiness actually improves when the Atoxyl is continued.

"Mercury in the form of 'Lambkin's cream' has been tried after Atoxyl. In some cases it has been given where patients have shown signs of relapse after the cessation of Atoxyl, and some of the less severe cases have improved considerably. In some cases those who have complained of giddiness after Atoxyl have shown improvement after the exhibition of Mercury. In severe cases, however, no improvement has been noticed."

Dr. C. J. Baker, reporting a month later, says that a certain number had had salivation from the Mereury treatment.

Drs. J. H. Goodliffe and H. Bayon report on their method of Mereury treatment as follows:—"The reason for choosing the two cyanide salts used by us was the ease and rapidity with which they are absorbed owing to their causing no coagulation of blood or plasma. It is intended to inject them intravenously in cases where trypanosomes should appear in the blood in quantity. Over one thousand injections have, up to date, been carried out with these salts, using a steel needle. Not a single case of even slight necrosis of the needle path or even simple induration has resulted. This record compares, I believe, very favourably with that of any other coagulating mercury salts. The rapid absorption has, however,

caused frequent salivation of a temporary character, not exceeding three to five days."

As can be seen from the tables (XXI–XXVI), Drs. Goodliffe and Bayon have so far been very successful with this treatment at Sesse. It must be remembered, however, that it is only two months since this treatment was started on Sesse.

There is also another point about treatment on Sesse. As will be seen from the tables comparing the results of Atoxyl treatment alone at the various camps since December 1, 1907 (table No. XX), the Sesse death-rate is very much lower than at other camps. Now the methods of Atoxyl treatment since December 1, 1907, have practically been the same at all camps, *therefore it looks very much as if there was a milder type of disease on Sesse than on the mainland*. If this is true it would explain the great difference in the death-rate observed by us in our mainland camps and that already reported by the German Commission at their former camp on Sesse.

*Treatment with * Soamin (Sodium-amino-phenyl-arsinate ; B. W. & Co.).*

Treatment with Soamin has been carried out on a small scale on Kyagwe Camp by Dr. van Someren, who strongly urges its more general use as, in his opinion, his results with it are as good as his results with Atoxyl. Dr. van Someren also lays stress on the uniformity of the different samples of this preparation and points out that its cost is only one-third of that of Atoxyl. A large consignment of Kharsin † has now been ordered so that very shortly it will receive an extensive trial.

Dr. van Someren's report on "Soamin" is given in detail :—

Sir,

I have the honour in accordance with the Principal Medical Officer's request to submit to you a report on the administration of "Soamin" (*sodium-amino-phenyl-arsinate*, Burroughs Wellcome and Co.) in the treatment of sleeping sickness.

My first trial of this drug was in September, 1907, with some samples sent me by Messrs. Burroughs Wellcome and Co., and though the quantity supplied was too small for a complete trial, the results were sufficiently encouraging to enable me to recommend a further trial.

I received further quantities from them in December, 1907, and 1 lb. from you on January 23, 1908. It is to be regretted, I think, that the supply was not sufficient for treating, say, 50 or 100 patients, from the point of view of testing for its toxicity over a large number of persons.

Characters.—1. Samples were in ‡tabloid form, fairly soluble in cold water, more so in hot, but the solution had a slight yellow colour and did not keep so well as that of the powder form.

This I thought might be due to some decomposition having occurred in the tabloid, *they are therefore not to be recommended*.

* Kharsin again is the name used (*vide* note, p. 7). Owing to some confusion between samples and literature dealing with them, Dr. van Someren adopted the name *Kharsin* for the substance which was afterwards called by Messrs. Burroughs Wellcome & Co. *Soamin*. [ED.]

† It was *Kharsin* that was ordered owing to the above-mentioned error in nomenclature. This substance, the methyl homologue of Soamin, proved most unsatisfactory, and its use has been abandoned. [ED.]

‡ It is probable, but not certain, that the tabloids consisted of *Orsudan* and not of *Soamin*. [ED.]

2. Fine crystalline powder fairly soluble in cold, more so in hot; saturation appearing to be approximately a 40 per cent. solution.

Solution is perfectly colourless and remains so for three or four days, when it acquires a slight yellow tinge as with Atoxyl, though not to such a great extent. *In a coloured bottle the solution keeps much longer colourless.*

Dose.—At first I tried small doses of 1 grain hypodermically, but this had no effect on the trypanosomes, so I gradually raised it to 5 grains which dose completely banished the parasites from the glands. Later, finding its effects similar to Atoxyl, and thinking it might be the same chemical in a purer form only, I tried 1 gm. as an initial dose followed by .5 gm. doses, with no toxic effects.

Toxicity.—As stated above, I have given it in repeated gramme doses with, up to the present, no signs of poisoning. However, bearing in mind our experience with Atoxyl, one will be better able to judge after the lapse of another month or so.

Therapeutic Action.—Trypanosomes disappear from the glands after the first adequate injection and do not seem to reappear subsequently either in the gland or blood, using the very useful method of examination recommended by Prof. Koch*; and the diminution of the glands and general improvement in the patients have been satisfactory, and in the special case reported its action was very marked and interesting.

Conclusions.—As far as my experience goes the action of this drug is similar in many respects to that of Atoxyl without the toxic effects of the latter. I do not know that it will prove any more lasting in its effects than Atoxyl, as the time which has elapsed has been too short for one to judge accurately, taking into consideration the fact that with Atoxyl the first improvement shown is not maintained in a great number of cases. It still remains to be seen whether with this drug that will also be the case, therefore a report on the same cases in three months' time will be of the greatest value and allow us to better judge of its permanency or no.

However, *I think we shall be perfectly safe in substituting this drug for Atoxyl as a routine in these camps*, especially in view of the fact that there has been so much uncertainty in the quality of Atoxyl supplied, and the alarming number of untoward symptoms which have been resulting, specially the ocular trouble, which so often proves refractory; my reasons for the suggested substitution I give below:—

1. Action is at least quite equal to that of Atoxyl, *without apparently its toxicity.*
2. The quality of the drug seems to be of a high standard, and *all samples have been similar and pure*, and show the careful manufacture that we are accustomed to in all Messrs. Burroughs Wellcome and Company's products.
3. *It is a British manufactured article from a firm of high reputation.*
4. Its price is *less* than a third that of Atoxyl, which seldom seems twice the same in its quality and purity. This last is seen in the great difference in the rapidity of decomposition and the degree of yellow which different samples of Atoxyl have.

* Dr. van Someren looked for trypanosomes in thick *fresh* films; Prof. Koch in thick *stained* films. [Ed.]

I append the results of cases treated to date; some have had a single dose of Mercury in addition, others have had Mercury combined as a routine, but these latter do not seem to show any superiority, and therefore I do not think they repay the great extra trouble involved.

I have the honour to be,

Sir,

Your obedient Servant,

(Signed) R. VAN SOMEREN,

Medical Superintendent.

Chagwe Camp,
March 19, 1908.

TABLE XXVIII.

TABLE OF SOAMIN RESULTS.

Soamin and Mercury.

State.			A.	B.	C.	D.	Totals.
Improved	—	5	4	—	9
Relapsed	—	—	—	—	—
Same	—	—	1	—	1
Died	—	—	1	—	1
Totals			—	5	6	—	11

TABLE XXIX.

Soamin.

State.			A.	B.	C.	D.	Totals.
Improved	..	..	3	6	6	—	15
Relapsed	..	..	—	—	—	—	—
Same	..	..	—	1	2	—	3
Died	..	..	—	—	—	—	—
Totals			3	7	8	—	18

Absentees: 2. Total number treated 31.

Signed, R. VAN SOMEREN.

Antimony Treatment.

A few cases of Sleeping Sickness have been treated with Antimony at Usoga Camp by Dr. C. J. Baker. Dr. Baker considers that this treatment has not been successful.

The details are as follows :—

1. Namuguvi (f.), 40 years, Class C on admission, treated as follows—
 January 31, $\frac{1}{16}$ grain of Antimony tartrate subcutaneously.
 February 1, $\frac{1}{16}$ grain of " " " No toxic symptoms.
 " 11, $\frac{1}{8}$ grain of Antimony tartrate subcutaneously. Patient
 seems much improved. Has no pain.
 " 12, $\frac{1}{8}$ grain as before.
 " 20, $\frac{1}{8}$ grain. Diarrhoea and colic.
 " 21, $\frac{1}{8}$ grain. Patient seems better and can walk more easily.
 Trypanosomes not found in the glands.
 " 27, patient died in the night. Had shown no change for the
 worse. On February 26 had shown no toxic symptoms.
2. Dodo (m.), 30 years, Class C on admission—
 January 31, $\frac{1}{16}$ grain Antimony tartrate subcutaneously.
 February 1, $\frac{1}{16}$ grain " " " No toxic symptoms.
 " 11, $\frac{1}{8}$ grain " " "
 " 12, $\frac{1}{8}$ grain " " "
 " 20, $\frac{1}{8}$ grain " " " Trypanosomes
 still present in the glands.
 " 21, $\frac{1}{8}$ grain Antimony tartrate subcutaneously. In *statu quo*.
3. Kutabisa (f.), 35 years, Class C on admission—
 January 31, $\frac{1}{16}$ grain Antimony tartrate.
 February 1, $\frac{1}{8}$ grain " "
 " 11, $\frac{1}{8}$ grain " " Patient is better and brighter.
 " 12, $\frac{1}{8}$ grain " "
 " 20, $\frac{1}{8}$ grain " " General improvement. Glands
 have not diminished in size.
 " 21, $\frac{1}{8}$ grain Antimony tartrate. Trypanosomes present in glands.
4. Watonaja (f.), 35 years—
 February 2, $\frac{1}{16}$ grain Antimony tartrate.
 " 3, $\frac{1}{16}$ " " "
 " 11, $\frac{1}{8}$ " " " Diarrhoea.
 " 12, $\frac{1}{8}$ " " "
 " 18, patient died in the night. Did not seem any worse than
 usual on the 17.
5. Wabibi (f.), 40 years—
 February 2, $\frac{1}{16}$ grain Antimony tartrate.
 " 3, $\frac{1}{16}$ " " "
 " 11, $\frac{1}{8}$ " " "
 " 12, $\frac{1}{8}$ " " "
 " 18, admitted to hospital with increased pain in the legs.
 " 20, $\frac{1}{8}$ grain Antimony tartrate.
 " 21, $\frac{1}{8}$ " " " Patient worse. Trypanosomes
 not found in glands.
 " 23, patient much worse, is in the typical last stage of Sleeping
 Sickness.
 " 26, patient died.

6. Mudesi (f.), 25 years. Class B on admission—

February 2, $\frac{1}{16}$ grain Antimony tartrate.

„ 3, $\frac{1}{16}$ „ „ „
 „ 11, $\frac{1}{8}$ „ „ „
 „ 12, $\frac{1}{8}$ „ „ „
 „ 20, $\frac{1}{8}$ „ „ „
 „ 21, $\frac{1}{8}$ „ „ „
 „ 28, $\frac{1}{8}$ „ „ „

Feels better. Looks well, trypano-
 somes appear (*Sic* (ED.)) in glands which are smaller.

7. Kisami (m.), 20 years. Class C on admission—

February 2 and 3, $\frac{1}{16}$ grain Antimony tartrate.

„ 11 and 12, $\frac{1}{8}$ „ „ „

„ 20 and 21, $\frac{1}{8}$ „ „ „ Trypanosomes present
 in glands, patient feels better.

The following old cases who have already had a course of Atoxyl and who have relapsed during the month of February have been treated in a similar way to the above :—

TABLE XXX.

Present State on February 29, 1908.				Class of Case on Admission.				Totals.
				A	B	C	D	
Improved	..	..	..	1	—	2	—	3
Relapsed	..	..	..	—	—	—	—	—
Continue in same state			..	—	—	3	—	3
Died	..	..	..	—	—	—	—	—

During the last three months 186 patients have presented symptoms probably due to the Atoxyl with which they have been treated. In the great majority of these the symptoms have been either a transitory giddiness or a transitory dimness of vision.

Giddiness.—Complained of by 82 people, is certainly caused by the Atoxyl.

Severe Colic and Diarrhœa.—Ten times.

Dimness of vision has been complained of by 70 people in the last three months.

In 25 of these this dimness of vision has now quite disappeared; in 36 it is stationary; in 6 it is improving; in 3 it is increasing.

In 6 the largest dose of Atoxyl given at one time was 1 gm. and system (*e*) was used; in 6 the largest dose was 1 gm. and system (*l*) was used; in 17 the largest dose was 0·7 gm. and system (*c*) or (*d*) was used; in 3 the largest dose was 0·6 gm. and system (*j*) was used; in 38 the largest dose was 0·4 gm. and system (*b*) was used.

The actual amount of Atoxyl given to each case with “disturbed vision” is seen on Table XXXI.

The cases on admission were classed as follows:—

A = 10.

B = 34.

C = 26.

D = 1.

40 cases were noted at first complaining of this symptom in February, 1908.

16 first complained in January, 1908.

14 first complained in December, 1907.

With regard to these cases of dimness of vision, it must be borne in mind that there is no "eye lesion" accompanying it, and that patients' statements have to be relied on entirely in ascertaining the fact of anything being wrong.

Drs. Goodliffe and Bayon, who have had a good many cases at Sesse, report on it as follows:—

"The majority of cases with dimness of vision only mentioned this symptom on being asked directly if their sight was good. A good many of them said that they had been suffering from impaired vision for two or three weeks, but had said nothing about the matter. Others who had kept away for some weeks only reported themselves later to get medicine for their eyes. In a few cases we were able to observe the condition from the very beginning. It began with pain in the eyes, and notwithstanding the fact that Atoxyl was immediately stopped and large doses of sodium sulphate given, partial blindness resulted in several people. In no case have we given more than 0.4 gm. of Atoxyl at a time. A great number of these cases of impaired vision admit having been formerly treated by Prof. Koch. We have taken great trouble to eliminate all those in whom the dimness of vision began before our treatment, unless an increase of the symptom was noticed after our injections. We have so far had 36 patients who say that their vision has become worse since the Atoxyl injections, and 26 of them admit that they have had injections before from the doctors of the German Commission. Most of these say that they have had from six to eight injections previously, but a few say that they have had more than 20. I am glad to say that in most of the cases the dimness of vision had been quite slight and transitory. Fourteen say that their sight is now quite restored; two deny ever having said that their sight was bad; four say that their sight has improved; and one makes such contradictory statements that no reliance can be placed on his word.

"Of the remaining 15 cases, most are slight, and the information as to its existence is only elicited by asking a direct and leading question. Two cases of total blindness have occurred. Both of them had been treated before by the German Commission."

Blindness.—Ten more patients have become blind since November 30, but all except two of them complained of failing vision before that date. All these cases except one have had injections of "yellow" Atoxyl.* This one is of special interest, owing to the rapid onset of amaurosis.

A late case, Class D, had been ill more than a year, admitted at Kyagwe Camp on January 16, and treated as follows:—

January 16, Atoxyl, 1 gm., with perchloride of Mercury, 0.01 gm.

January 17, Atoxyl, 0.5 gm.

* *Vide* Dr. Nierenstein's "Report on Chemical Examination of 'Yellow Atoxyl'." Page 35.(Ed.)

January 19, he awoke and found he was quite deaf.

January 21, complained of failing vision.

January 24, was quite blind.

February 2, died during the night, immediate cause not quite clear.

Fundi were normal, but pupils, especially that of the right side, widely dilated. This may have been a case of pure idiosyncrasy to the drug.

Paresis of lower extremities with increased knee jerk has been noticed eight times.

Deafness.—Five patients have become completely deaf.

Suppression of urine has occurred in one patient.

Nearly all the above are recognised symptoms of aniline poisoning.

Our Medical Superintendents of Camps lay stress on the fact that since they have entirely discontinued using Atoxyl which makes up into a yellow tinged solution they have had no cases of serious visual disturbance or marked giddiness among their patients. They seem quite satisfied with the Atoxyl they are at present using, and lay stress on the necessity of prolonged regular treatment.

Each Camp has now got a Maltese Hospital Assistant, and these men, considering that they have no medical training of any sort previous to their arrival in Uganda, are already of some assistance and are steadily learning their work.

This report deals with our Sleeping Sickness Camps up to March 1, 1908, and up to the return of Dr. A. D. P. Hodges from leave. Dr. A. D. P. Hodges has now resumed charge of Sleeping Sickness work in Uganda.

(Signed) A. C. H. GRAY,

Captain, R.A.M.C.

TABLE XXXI.

Table of Sleeping Sickness Patients admitted since December 1, 1907, who have presented certain symptoms possibly due to the Atoxyl administered to them, showing the amount of Atoxyl taken in each case before such symptoms were noticed.

Character of Symptoms Observed.	Amount of Atoxyl in grammes.						Totals.
	under 2.	2-4.	4-6.	6-8.	8-10.	over 10.	
Marked giddiness	27	30	18	6	1	—	82
Colic and diarrhoea often with vomiting	3	6	1	—	—	—	10
Dimness of vision	7	27	17	2	4	13	70
Total blindness	1	1	3	1	—	4	10
Paresis of lower extremities with increased knee jerks	1	1	3	—	1	2	8
Sudden deaths	—	—	—	—	—	—	—
Vomiting only	—	—	—	—	—	—	—
Deafness	2	2	—	1	—	—	5
Suppression of urine ..	1	—	—	—	—	—	1
Any other symptoms ..	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	186

TABLE XXXII.

Table showing number of Patients who have become Totally Blind since November 30, 1907.

Class of case on admission.	Month of onset of symptom.	Length of treatment, in months, before its appearance.	Total amount of Atoxyl, in grammes, before appearance.	System of Atoxyl administration.	Largest dose of Atoxyl given.
C	Jan., 1908	1	5 grammes	(f)	1 gramme
D	Dec., 1907	1½	7 "	(c)	0·6 gramme
B	Dec., 1907	3½	11 "	(c)	0·6 "
B	Jan., 1908	3½	11 "	(c)	0·7 "
B	Jan., 1908	3½	10 "	(c)	0·7 "
B	Jan., 1908	12	10 "	(f)	0·6 "
C	Jan., 1908	5 days	1·5 "	(k)	1 gramme
C	Feb., 1908	2	5 "	(k)	1 "
C	Feb., 1908	1	3·2 "	(b)	0·4 gramme
B	Feb., 1908	2	5·2 "	(b)	0·4 "

REPORT ON EXAMINATION OF YELLOW ATOXYL.

(Vide page 32).

BY DR. NIERENSTEIN, OF THE RUNCORN LABORATORIES.

The Atoxyl received for examination was a slightly yellow powder, no distinct crystals were to be seen by the naked eye. It dissolved in a strong alkali (40 per cent. KOH) with a yellow colour; this has never been observed by us in other samples of Atoxyl. It contained free inorganic arsenic, *traces* of free anilin, and a second substance which was isolated by re-dissolving the free arsanilic acid in strong hydrochloric acid, in which solvent the second compound was insoluble. This product, too, dissolved with a yellow colour in strong alkali.

Quantitative Analysis.—The estimation of water of crystallization corresponded to: $\text{H}_2\text{NC}_6\text{H}_4\text{AsO} \begin{smallmatrix} \text{OH} \\ \diagup \\ \text{ONa} \end{smallmatrix} + 3\frac{1}{2}\text{H}_2\text{O}$, which requires 21.30 per cent. ars.

An estimation of the total arsenic gave 22.30 per cent. ars. Thus leaving for inorganic arsenic .97 per cent. ars. However, only .63 and .67 of inorganic arsenious acid were found.

The arsenic estimation of the second substance (14 gr. Atoxyl contained .0873 gr. of this substance) gave 32.17 per cent. ars.

This analysis shows that in the Atoxyl which was sent out on June 21, 1907, there was a second substance present which in all probability is an oxidation product of Atoxyl.



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